

CHARTING SIMULTANEOUS OBSERVATIONS.

The dates pertaining to the simultaneous observations at Greenwich noon are Greenwich dates and not local time dates. They do not change as the vessel moves from point to point, east or west. Vessels sailing eastward, or in the same direction as the earth's rotation, have local days that are longer than Greenwich days; those sailing westward have shorter local days. On the east going vessels crossing the Pacific there must be one local day on which there will be two Greenwich noon observations. On west going vessels there will be a local day so short that it will have no Greenwich noon observation. These days will be those on which the vessel crosses the one hundred and eightieth meridian.

Observers and students should bear in mind the following information:

In order to avoid confusion in charting meteorological data on the Pacific Ocean, it is necessary to keep in mind the rules adopted for fixing the dates, viz, the days of the week, the month, and the year. The residents of the islands in the Pacific keep their records on dates that accord with the usage of neighboring islands with which they are in commercial intercourse. On July 4, 1892, King Malietoa ordered that the American date, instead of the Australian date, should be kept throughout the Samoan Islands. Other islands had made similar changes at previous dates; thus, on December 31, 1844, the American date was abolished in the Philippine Islands and the European date adopted. At the present time the islands of the Pacific keep their dates as shown in the following list, which is taken from the Pilot Chart published September 1, 1899, by the United States Hydrographic Office:

American dates: Alaska, St. Lawrence Island, all the Aleutian Islands, Morell Island, Phoenix Islands, Samoan Islands.

Asiatic dates (one day later than the American dates): Siberia, Kamchatka, Copper Island, Marshall Islands, Gilbert Islands, Ellice Islands, Fiji Islands, Friendly Islands, New Zealand, Chatham Island.

When it is Saturday the first day of the month on the eastern or American side of this date line it is Sunday, or the second day of the month, on the western or Asiatic side, and this is true at any hour of the day or night.

In this connection the following instructions relative to simultaneous observations were lately issued by the United States Hydrographic Office:

In crossing the one hundred and eightieth meridian, observers aboard westward bound vessels sometimes make the mistake of dropping a day from the record of the Greenwich mean noon observations, and conversely of using the same date twice when eastward bound. This is incorrect. The observations in both cases should be dated consecutively, as a little consideration will show.

Take a case of a westward bound vessel making four degrees of longitude per day, and suppose her longitude at Greenwich mean noon of April 15 is 178° west. The local date and time of the observation is April 15, 0 h. 8 m. a. m. The local time of the next observation will be 23 h. 44 m. later than this, or (disregarding the change of date) April 15, 11 h. 52 m. p. m.; but advancing this date for the change from west to east longitude gives for the true local date and time of the observations April 16, 11 h. 52 m. p. m.

Again, let the vessel be eastward bound, and suppose her longitude at Greenwich mean noon of April 15 be 178° east. The local date and time of the observation is April 15, 11 h. 52 m. p. m. The local time of the next observation will be 24 h. 16 m. later than this, or (disregarding the change of date) April 17, 0 h. 8 m. a. m.; but setting back this date for the change from east to west longitude gives for the true local date and time of the observation April 16, 0 h. 8 m. a. m.

THE SEASON OF VEGETATION.

In the MONTHLY WEATHER REVIEW for February, 1901, page 55, Mr. Henry Pennywitt has given charts showing the natural division of the year into the colder and warmer half. In general, the warmer half is that portion of the year in which the average daily temperatures are above the normal average annual temperature. Presumably, all the growth of crops (except winter wheat) must take place within this warm season; in fact, for delicate vegetation, it must take place within a much shorter period, viz: the interval between the last frost of spring and the first of autumn. Tables and charts showing the average date of the last killing frost of spring and the first of autumn were published in Volume XVI MONTHLY WEATHER REVIEW, pages 51 and 165, respectively. The latest publication of this data as revised is to be found in the Year

Book of the Department of Agriculture, 1897, page 618. According to these charts, we should have for Fargo, N. Dak., near Moorhead, Minn., the dates May 15 for the latest spring frost and September 15 for the earliest autumn. A recent bulletin of the experiment station for North Dakota, which is located at Fargo, says:

The temperature which registers 26° F. has been taken as representing what is commonly known as killing frost. The following table gives the record of killing frosts during the past eight years at the experiment station at Fargo and the accompanying minimum temperature.

Year.	Last killing spring frosts.		First killing autumn frosts.		Interval between killing frosts.
	Date.	Minimum temperature.	Date.	Minimum temperature.	
1894	April 15	21.5	Sept. 17	20	Days. 155
1895	May 21	20	Sept. 30	21	132
1896	June 7	26	Oct. 9	12	124
1897	May 11	21	Sept. 9	24	121
1898	May 14	23	Sept. 29	17	138
1899	May 9	25	Sept. 17	26	131
1900	April 22	25	Sept. 18	23	140
1901	May 10		Sept. 23		136
Average	May 10		Sept. 23		136

The following table gives similar data for the light frosts:

Year.	Last light spring frosts.		First light autumn frosts.		Interval between light frosts.
	Date.	Minimum temperature.	Date.	Minimum temperature.	
1894	May 19	31	Sept. 11	29	Days. 115
1895	May 26	29	Aug. 31	30.5	97
1896	June 7	26	Sept. 17	20	102
1897	May 16	30	Sept. 8	27	115
1898	May 18	30	Sept. 18	9	118
1899	May 9	25	Sept. 17	26	131
1900	June 7	30	Sept. 18	23	108
1901	May 23		Sept. 12		111
Average	May 23		Sept. 12		111

From the above tables it will be seen that the interval between killing frosts has varied between one hundred and twenty-one and one hundred and fifteen days, while the interval between light frosts has varied between ninety-seven and one hundred and thirty-one days. The average date for the latest light frost is thirteen days later than the latest killing frost in the spring and eleven days earlier in the autumn. The relation of these dates to the maturing of the crops depends largely upon the plant under consideration. Thus, wheat that was sown sometime between April 14 and May 8 matured in from eighty-three to one hundred and twenty-three days during the eight years under consideration, the average being one hundred; that is to say, it was sown before the last killing frost of spring and matured from ten to thirty days before the first killing frost of autumn. Oats sown between April 8 and May 19 matured in from eighty to one hundred and fourteen days, depending, of course, upon the character of the summer, the average being ninety-five, and always before the dates of killing frosts. Barley sown between April 3 and May 21 matured in from seventy-one to one hundred and eleven days, the average being eighty-eight. Flax sown between May 3 and June 10 matured in from seventy-seven to one hundred and nine days, the average being eighty-nine. Millet sown between May 31 and June 8 matured in from sixty-six to one hundred and forty-two days, the average being ninety-six. Spelt sown between April 25 and May 10 matured in from eighty-six to ninety-six days, the average being ninety-two.

VOLCANIC DUST.

In accordance with the circular of May 27, 1902, Mr. M. B.